DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Office of Structural Materials
Quality Assurance and Source Inspection

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Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: 69.28

WELDING INSPECTION REPORT

Resident Engineer: Pursell, Gary
Address: 333 Burma Road
City: Oakland, CA 94607

Report No: WIR-004499
Date Inspected: 20-Oct-2008

Project Name: SAS Superstructure
Prime Contractor: American Bridge/Fluor Enterprises, a JV
Contractor: Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island

OSM Arrival Time: 2300
OSM Departure Time: 730
Location: Shanghai, China

CWI Name:	Li Yan Hua			**CWI Present:**	☑ Yes	☐ No	
Inspected CWI report:	☐ Yes	☑ No	☐ N/A	**Rod Oven in Use:**	☐ Yes	☐ No	☑ N/A
Electrode to specification:	☑ Yes	☐ No	☐ N/A	**Weld Procedures Followed:**	☐ Yes	☑ No	☐ N/A
Qualified Welders:	☑ Yes	☐ No	☐ N/A	**Verified Joint Fit-up:**	☑ Yes	☐ No	☐ N/A
Approved Drawings:	☑ Yes	☐ No	☐ N/A	**Approved WPS:**	☑ Yes	☐ No	☐ N/A
				Delayed / Cancelled:	☐ Yes	☑ No	☐ N/A

Bridge No: 34-0006
Component: OBG

Summary of Items Observed:

Caltrans Quality Assurance (QA) Inspector, Ken Jobes, arrived on site at the Zhenhua Port Machinery Company (ZPMC) facility at Changxing Island, in Shanghai, China, to randomly monitor welding and Quality Control (QC) functions. While on site, the QA Inspector observed and/or discovered the following:

OBG Sub-Assembly Shop – Bay 1

Caltrans Quality Assurance (QA) Inspector, Ken Jobes, was present to monitor activities associated with the Production Monitoring Test (PMT) of Orthotropic Box Girder (OBG) Deck Panel U-rib welds. The PMT representing Deck Panels DP179-001 and DP324-002 was monitored. After MT of the tack welds was accepted by ZPMC Level II MT Technician, Cai Xin Xin, the three ribs (six welds) were simultaneously welded to simulated deck plates in the horizontal groove (2G) welding position. The Welding Procedure Specification (WPS) used was WPS-B-T-2342-U1(Urib)-4. It is a combination procedure using gas metal arc welding (GMAW) for the root pass and submerged arc welding (SAW) for the cover or fill pass. The filler metals being used were verified to be as specified on the WPS; 1.4 mm diameter, ER70S-6 (JM-56) for GMAW and 4.8 mm diameter EH14K (H14) for SAW. During the test, the Caltrans QA Inspector recorded the parameters observed on the U-Ribs PMT Inspection Sheet, dated 10-21-08, for both welding processes. The name of the gantry operators and each of the welding operators' identification numbers were also recorded on the U-Ribs PMT Inspection Sheet. ZPMC Certified Welding Inspector (CWI), Li Yan Hua (07120701) and ABF QA Inspector Huang Wen Guang were present during welding.

The final weld was visually examined and accepted by ZPMC CWI, Li Yan Hua; and ABF QA Inspector Huang

Wen Guang. All welds appeared to meet the specified visual examination acceptance criteria. After ultrasonic examination (UT) and acceptance by ZPMC Level II UT Technician, Xu Wei, the Caltrans QA Inspector designated the locations for the required macro-etch specimens. All macro-etch specimens were prepared and found acceptable by ZPMC CWI, and ABF QA Inspector. The macro-etch specimens were then examined by the Caltrans QA Inspector and the depth of penetration on each measured and the results recorded on Caltrans Project 04-0120F4 SAS OBG Fabrication Macro Etch Log.

All above observations appeared to meet the requirements of the job specifications.

The Caltrans Inspector also observed the tacking U-ribs to deck panel, DP324, which has four ribs. The tacks were 85 to 90 mm long. The backhand (pull) technique was being used and the angle of the gun varied during welding but was generally pointed toward the vertical member (U-rib). The crater was filled with minimum backing up. Sometimes they left a small hole in the crater. The WPS being used was WPS-B-T-2342-U5(U-rib). Globular was the predominant mode of transfer. The welder was Liu Xiao Min (I. D. 059393). ZPMC Certified Welding Inspector (CWI), Li Yan Hua (007120701) and ABF QA Inspector Huang Wen Guang were monitoring this welding. The Caltrans Inspector verified that the filler metal, ER70S-6 (JM-56), and the diameter of filler metal (1.4 mm) were in compliance with the WPS, as was the voltage (26.8-27.2). The amperage varied during the tacking from approximately 280 amps to 330. The WPS range is 330 – 350. The average/mean amperage appeared to be below the specified range. The amperage dropped considerably (as low as 125 amps) during the last 3 – 5 seconds and during the process of breaking the arc. The gas flow rate was 22-23 liters/minute, which complies with the WPS. The machine settings were not changed during the period of observation. No cracking was observed. These observations were made from 23:55 to 01:55, when work stopped. Work began again at 04:10 and the QA Inspector observed that the welder, welding technique, and parameters were the same as previously above, except that the amperage varied between 340 and 380 and the voltage varied from 26.1 to 27.0 during most of the welding of each tack. During the last 3 – 5 seconds, the amperage dropped to as low as 136 and the voltage dropped to as low as 17. No ZPMC QA/QC personnel were present from 04:10 thru the completion of welding at 05:25. ABF Inspector Huang Wen Guang was present from 04:35 to 04:37 and from 04:55 to completion of welding. The QA Inspector did not observe ZPMC QA/QC personnel measure or record any parameters during the entire shift. ZPMC CWI, Li Yan Hua, did show the QA Inspector four entries of documentation prior to the arrival of the QA Inspector. ZPMC documentation showed voltage, amperage and travel speed within the range of the WPS.

Voltage, amperage and travel speed do not appear to meet the specified ranges of the applicable WPS.

Summary of Conversations:

As identified within the contents of this report.

Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Peter Dautermann (1500219953) China, who represents the Office of Structural Materials for your project.

Inspected By: Jobes,Kenneth Quality Assurance Inspector

WELDING INSPECTION REPORT

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Reviewed By: Carreon,Albert QA Reviewer